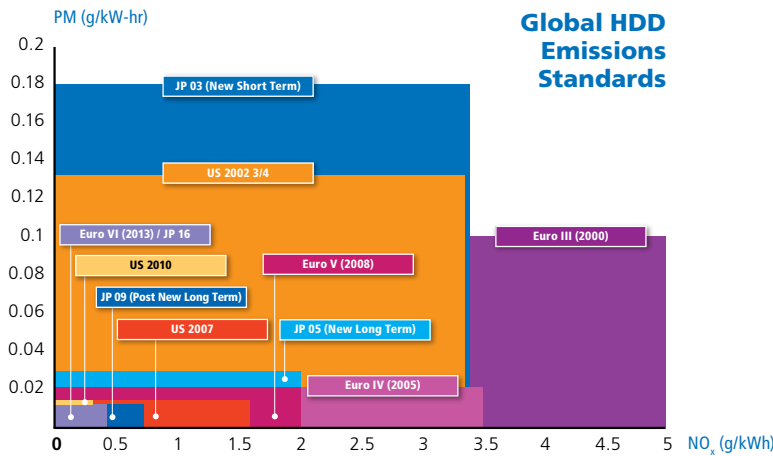


Heavy Duty Diesel Emissions Guide Europe, USA and Japan



Euro V Emissions Standards (g/kWh) for HDD Engines

Introduction	Test Cycle	CO	HC	NO _x	PM	Smoke m ⁻¹
01-10-2008	ESC	1.5	0.46	2	0.02	0.5
	ETC	4	0.55	2	0.03	

Euro VI Emissions Standards (mg/kWh) for HDD Engines

Introduction	Test Cycle	CO	THC	NO _x	NH ₃ ppm	PM	PN (#/kWh)
31-12-2012	WHSC	1 500	130	400		10	8.0 x 10 ¹¹
	WHTC	4 000	160	460	10	10	6.0 x 10 ¹¹

EU On-Board Diagnostics (OBD) Threshold Limits

		Effective Date	NO _x	PM
Euro V	(g/kWh)	01/10/2008	7.0	0.1
Euro VI	(mg/kWh)	31/12/2012	1 200	25

Dates refer to new type approvals; all type approvals 01-10-2009 (Euro V), 31-12-2013 (Euro VI)
Admissible level of NO₂ in the NO_x limit value may be defined at a later stage.

European Durability Requirements for HDD Engines

Vehicle Category	Euro IV-V	Euro VI
Bus < 5t	100 000 km or 5 years	160 000 km or 5 years
Truck 3.5 - <16t; Bus < 7.5t	200 000 km or 6 years	300 000 km or 6 years
Truck ≥ 16t; Bus ≥ 7.5t	500 000 km or 7 years	700 000 km or 7 years

Deterioration Factors

	CO	THC	NO _x	NH ₃	PM	PN
Euro V	1.1	1.05	1.05	-	1.1	-
Euro VI	1.3	1.3	1.15	1.0	1.05	1.0

Test Procedures Smoke opacity is measured on the European Load Response (ELR).
m⁻¹ = unit to measure smoke during ELR test cycle.

Notes Standards apply to all vehicles over 3 500 kg with diesel engines. As of 1 January 2009, fuel for all on-road diesel vehicles must have a maximum sulfur content of 10ppm.

US Emissions Standards (g/bhp.h) for HDD Engines

	CO	NMHC	NO _x	PM
Standard:	15.5	0.14	0.2	0.01
Phase In*: Model Year	2007	100%	50%	50%
	2008			
	2009			
	2010			

*The phase-in % represents the % of manufacturers' sales which must meet the above emissions limits.

US Durability Requirements (for Model Year 2004 and later)

Vehicle Category	
Light Heavy Duty* (LHDDE - Class 2b - 5)	110 000 miles / 10 years 8 500 lbs - < 19 500 lbs
Medium Heavy Duty (MHDDE - Class 6 & 7)	185 000 miles / 10 years 19 500 lbs - < 33 000 lbs
Heavy Heavy Duty (HHDE - Class 8)	435 000 miles / 10 years ≥ 33 000 lbs including urban bus / 22 000 hours
*In California LHDDE = 14 000lbs - < 19 500lbs (Class 4 & 5)	
Emission warranty remains at 5 years / 100 000 miles.	
Test Procedures FTP, SET, NTE test - with limits of 1.5 x FTP standards for engines meeting a NO _x Family Emissions Limit (FEL) of 1.5 g/bhp.h or less.	
Notes Diesel fuel regulations require 15ppm sulfur fuel for MY2007 from 1 June 2006.	

Japanese Emissions Standards (g/kWh) for HDD Engines

Introduction	Test Cycle	CO	NMHC	NO _x	PM	Smoke
2005 (NLT)	JE05	2.22	0.17	2.0	0.027	25%
2009 (PNLT)	JE05	2.22	0.17	0.7	0.010	
2016 (JP16)	WHTC	2.22	0.17	0.4	0.010	

JP05 standards came into force in Oct 2005 for new, domestic vehicles and in Sept 2007 for existing and imported vehicles.

Post New Long Term (PNLT) Standards :

01-10-2009	Domestic Manufactured Diesel Vehicles > 12 000 kg
01-10-2010	Domestic Manufactured Diesel Vehicles > 3 500 kg and ≤ 12 000 kg Imported and existing domestic vehicles compliant 11 months after new domestic vehicles

JP16 Standards

Introduced from 2016 but delayed until 2017 for tractor units and 2018 for trucks < 7.5t GVW

Notes Standards apply to vehicles with diesel engines with a GVW > 3.5t

Japanese Durability Requirements for HDD Engines

Vehicle Category	
GVW > 3.5t and ≤ 8t	250 000 km
GVW > 8t and ≤ 12t	450 000 km
GVW > 12t	650 000 km

Test Procedures

JE05	Used from 2005. Based on Tokyo driving conditions
WHTC	Weighting factor of 14% is applied to cold start.

Regional PM Standards (GVW > 2.5t)

From 2003, separate PM standard in Chiba, Kanagawa, Saitama and Tokyo. From 2006, 0.180g/kWh PM standard in Tokyo and Saitama. Two exceptions: vehicles < 7 years old and/or vehicles with particulate filter.

Notes Vehicles tested using 50ppm sulfur fuel for 2005 standards. Diesel fuel used in vehicles conforming to PNLT standards must have maximum sulfur content of 10ppm.